

C Appendix C: Methods Used in Himmelstein and Colleagues? Analysis of U.S. and Canadian Health Care Labor Forces

U.S. DATA

Himmelstein and colleagues' principal source of data for the United States is the Current Population Survey (CPS) Annual Demographic File collected annually by the U.S. Bureau of the Census and available in machine readable form since 1968. Himmelstein and colleagues analyzed the CPS file for each year from 1968 to 1992. For several years they analyzed two different versions of the CPS data, one prepared according to revised coding and/or weighting procedures and the other reflecting the procedures used in the prior year, in order to establish reliable time series.

The CPS is a Census Bureau survey of approximately 60,000 households representative of the civilian noninstitutionalized population. About 6,000 individuals employed in the health care sector fall into the CPS sample each year. The part of the survey conducted in March of each year collects demographic information and data on employment and income for the previous week and for the previous calendar year. Himmelstein and colleagues chose to use the CPS rather than the Bureau of Labor Statistics' establishment survey (whose larger sample size allows estimates with narrower confidence intervals) because the CPS spans a longer time period and the data are more closely comparable to available Canadian data. All estimates of numbers of health personnel in the United States as a whole were derived from the CPS sample using the March CPS Final Weight, a multiplier assigned by the Census Bureau to each individual in the sample to allow accurate extrapolation to the U.S. population as a whole, adjusting for this sample design and the failure to obtain interviews with



some households. OTA calculated 90 percent confidence intervals for all relevant estimates based on standard errors provided by the Census Bureau (39). These confidence intervals are presented on appropriate figures in the text of this OTA background paper.

For 1971 and subsequent years Himmelstein and colleagues defined health care workers as those persons with any work experience in the reference year and whose principal place of employment, whether part time or full time, was the office of a physician or other health practitioner, a hospital, a nursing or personal care facility, or other health service facility (U.S. Census Bureau industry classification codes 812 through 840). Prior to 1971, the CPS file classified health care workplaces dichotomously: hospitals or other health care workplaces. Himmelstein and colleagues considered anyone employed in either of these a health care worker for 1968 through 1970.

Himmelstein and colleagues also included in this analysis people employed in nonhealth care workplaces who listed their occupation as: physician; nurse; inhalation, occupational, physical, speech, or other therapist; clinical laboratory, radiologic, dental laboratory/medical appliance, or other health technician/technologist; or other clearly identifiable health-related occupation.

Unfortunately, Census Bureau data do not allow identification of administrative and clerical personnel who perform health care-related duties in nonhealth care workplaces (e.g., insurance company employees). Similarly, it was not possible to identify workers in the manufacturing and construction industries who produce health care-related goods or services (although their relevance to this analysis is minimal since they would never likely be considered administrative personnel).

Occupational classifications were based on the Census Bureau's Occupational Classification Codes for Detailed Occupational Categories. Himmelstein and colleagues grouped all health care occupations into the following 17 categories:

- physicians;
- registered nurses;
- licensed practical nurses;

- management and related;
- administrative support, except financial;
- administrative support, financial;
- professional and technical except health;
- social service;
- other health diagnosing;
- therapists;
- other health assessment and treating;
- health technologists and technicians;
- aides and other health service;
- food preparation and food service;
- cleaning, building service and laundry;
- building construction and maintenance; and
- all occupations not elsewhere classified (n.e.c.).

In the Census Bureau's classification, physicians, registered nurses, and licensed practical nurses are each identified by a single code. Each of Himmelstein and colleagues' 14 other groups included several individual occupations.

■ Defining Hours of Work and Full Time Equivalents (FTEs)

Himmelstein and colleagues defined one FTE as 2,000 hours of work per year (40 hours/week x 50 weeks/year). For years since 1976 the authors constructed this variable from responses to the CPS questions about place and occupation of employment, and hours and weeks worked during the previous calendar year. They calculated FTEs by multiplying each respondent self-reported usual hours of work by weeks of work and dividing by 2,000. However, prior to 1976 the CPS did not collect comprehensive data on hours of employment during the previous calendar year. For these earlier years Himmelstein and colleagues analyzed employment and hours of work based on data for the week preceding the survey (which always takes place in March), on the assumption that this single week's data were representative of employment for the full, concurrent calendar year. Each respondent's "actual hours of employment" in the reference week was multiplied by 52 and divided by 2,000 to arrive at an FTE figure.

Himmelstein and colleagues assessed the effects of this methodologic change by calculating

health employment for 1975 using both the “last week” data from the 1975 CPS and the “last year” data from the 1976 CPS. Both 1975 estimates are given in each of the tables derived from the CPS data. As expected, the number of people indicating that they had worked in health care at any time “last year” exceeded the number saying that they had worked in health care “last week.” However, this discrepancy vanished after extrapolation to FTEs during 1975. Thus, continuity of time series data is somewhat better for FTEs than for numbers of persons employed.

Himmelstein and colleagues inspected graphs of time trend data on the number of persons and FTEs employed in each occupation group. A discontinuity was evident in the data by number of people in 1976, while the FTE curve showed no such discontinuity. The gap between the lines for number of persons and FTEs was an indicator of the average work schedule for members of the occupational group; for groups whose work year exceeds 2,000 hours (i.e., physicians), FTEs exceed persons. Conversely, part-time employment is common in many predominantly female occupations in which the number of persons employed exceeds the number of FTEs.

Himmelstein and colleagues calculated FTEs per million population by dividing the number of FTE health workers by the U.S. resident population as reported in the *Statistical Abstract of the United States*.

■ Reconciliation of Different Coding Schemes, Sample Designs, and Weighting Procedures

Occupation Codes

Between 1968 and 1991 the Census Bureau undertook two major reclassifications of occupations following the 1970 and 1980 censuses (40,41,42), as well as several minor reclassifications. The second of the major revisions involved a change in the philosophy of occupation classification, relying less on job titles and more on the content of work.

Himmelstein and colleagues dealt with these classification changes by preparing a comprehensive list of every occupational code represented in the health sector between 1968 and 1991. For each job title Himmelstein and colleagues reconciled the three systems of classification by comparing occupation titles (and, when necessary, the occupational definitions) in each of the classification schemes. Where there was not a clear identity between occupational titles or descriptions in the different systems, they allowed the codes to stand as distinct occupations.

Sample Design

The Bureau of the Census updated the recoding, imputation procedures for dealing with missing data, and/or the weights used to extrapolate the CPS to the population in 1975, 1983, and 1987. For each of these three years, Himmelstein and colleagues analyzed CPS data processed using both the old and new procedures, and report both sets of values.

CANADIAN DATA

Detailed data on health care workers in Canada come from the 1971 and 1986 Canadian censuses. Statistics Canada provided Himmelstein and colleagues with data tapes including all individuals employed in health sector industries, based on industry classifications similar to those used by the U.S. Census Bureau since 1971. However, inspection of the data revealed that more nonphysician practitioners’ offices appear to be classified under “Health and Medical Services, n.e.c.” rather than under the rubric “Offices of Practitioners,” compared with the U.S. data. This means (hat comparisons of the labor force employed in practitioners’ offices in the United States and Canada are subject to error.

The occupational classification of Canadian health care employees was based on Statistics Canada’s 1971 Standard Occupational Codes (S. O. C.) codes. In most cases these codes closely correspond to the U.S. occupational coding system. Where discrepancies or uncertainties arose, Himmelstein and colleagues consulted with offi-

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cials at Statistics Canada as well as the International Labor Organization's *International Standard Classification of Occupations*. Canadian health occupations were grouped into the same 17 categories as those used for the United States. In a few cases the Canadian classification conventions appear to differ from those used in the United States. This is most evident in the assignment of personnel to the occupational group "aides and other health service." The Canadian census appears to define these occupations more narrowly than does the United States. Hence, many individuals classified under the rubric "all occupations, n.e.c." in the Canadian data would probably be classified as "aides and other health service" under U.S. conventions.

Statistics Canada's data classified the number of hours worked as a range (e.g., 20-30 hours). To calculate FTEs, Himmelstein and colleagues assigned each employee to the midpoint of the specified range of hours (for the category >50 hours/week Himmelstein and colleagues assigned the employee to 52.5 hours), multiplied by the number of weeks worked during the year, and divided by 2,000.

Himmelstein and colleagues calculated employees and FTEs per million population using the Canadian resident population for each year as the denominator.